spoke of " the cycle within which dearths and plenties make their revolution." The peculiar feature in these wider ranges of variation is the gradual attainment of a maximum[1] of intensity;. then a descent to a minimum [1]—the complete course between a maximum and the succeeding maximum, or from one minimum to the next, being comprised within a closely equal duration of time. The shape, position and dimensions of the orbits of the planets are thus in perpetual variation in consequence of the mutual gravitational attraction by these bodies. If the changes persisted in accumulation in one direction only, the stability of the solar system would be ultimately destroyed; but these perturbations of the orbits— deviations now on one side, then on the other, of an average form—are periodic in nature, and confined within marked and narrow limits —maxima and minima alternately being reached. The facts in the following exposition—which presents the concurrence of cyclical effects produced upon the earth with a cyclically occurring condition of the sun—have been collected from the most authoritative scientific treatises. The most orderly plan will consist in first describing the knowledge which has been obtained respecting the spots on the sun whose influence (or rather the influence of gigantic periodic convulsions of energy occurring in that body of which the spots are prominent indications) is traceable in terrestrial changes. The visible surface or disc of the sun (named the photosphere or round of light) is intensely lustrous—consisting of matter in a gaseous or vaporous state— and furnishes the source of all the heat and light which the earth receives. At regularly recurrent intervals the uniform level of this intensely brilliant and enveloping surface is partially rent by cyclonic storms, possibly of an electric nature, into cavities or hollows which have received the name of spots. These spots or perforations of the photosphere first appear on the eastern edge of the sun: are carried across by his revolution (besides possessing proper

[1] The maximum value of a quantity is not the absolutely highest value which that quantity can attain; it is that

point in its ascent of values which is higher than the infinitely near point on each aide of it: the minimum being that point in the descending course of values which is lower than the point which is infinitely close to it on each side.